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(71) Applicant: **Sofiplast, S.A.**
08570 Torello (ES)

(72) Inventor: **Fort Prades, Josep**
08551 Tona (ES)

(74) Representative: **Curell Sunol, Jorge et al**
c/o Dr. Ing. M. Curell Sunol I.I. S.L.
Passeig de Gràcia 65 bis
08008 Barcelona (ES)

(54) Dispensing container provided with foaming device

(57) A dispensing container provided with a foaming device, comprising: a flexible container body (1), a head member (8) fitted to said neck (5); a dip tube (9); and a stopper member (2); a dip tube holder (10) attached to the head member (8) and which is provided with: [i] a tubular appendix (12) to hold the dip tube (9), there being formed between the latter two an axial space (13) for the passage of liquids; [ii] an inwardly extending crown (17) having a central opening (18); the crown (17) facing said dip tube (9), with which it limits a transverse passage (20) for the passage of liquids from the axial space (13); [iii] a decompression chamber (16) located downstream of the central opening (18) and wider than the central aperture (18); and [iv] at least one transverse mesh (11, 24), provided with orifices forming the sole passage means, downstream of said decompression chamber (16).

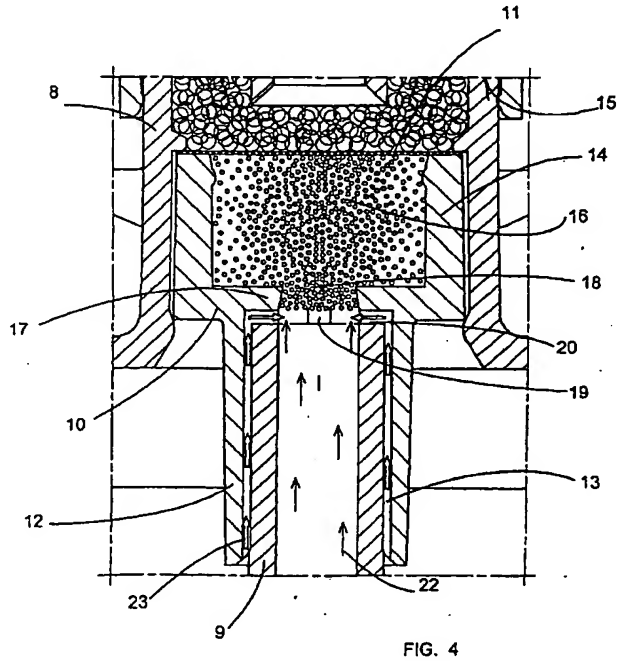

FIG. 4

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Description

[0001] The invention relates to a dispensing container provided with a foaming device, comprising: a container body made from flexible material, having a bottom and a neck defining a mouth; a head member fittable to said neck; a dip tube extending from said mouth to short of said bottom and allowing fluids to flow therethrough in an axial direction; and a stopper member, adapted to occupy alternately a closed position and an open position.

[0002] It is frequently required to apply liquids over certain surfaces without the liquid spreading from the particular area where it is applied. To this end, foams generated from the liquid it is desired to apply and a gas are habitually used. Containers containing a liquid and a pressurised propellant gas and which, when a valve operating button is pressed, supply a foam formed by the liquid it is desired to apply and the propellant gas are known. The propellant gas is usually partly liquefied in the pressurised pack. Chlorofluorocarbonated (CFC) products have been frequently used among the propellant gases. These, as has been subsequently shown, represent a serious burden for the environment. Other propellant gases have the drawback of relatively higher costs. Furthermore, the containers are generally not rechargeable so that, once used, they are thrown away, which also represents a relatively high cost and an additional burden for the environment.

[0003] It is an object of the invention to overcome these drawbacks. This object is achieved with a dispensing container provided with a foaming device of the type first mentioned above characterised in that it comprises a dip tube holder attached to said head member and which is provided with: [i] a tubular appendix penetrating in said neck and in which there is attached said dip tube, there being formed between said appendix and said dip tube an axial space suitable for the passage of liquids from said container body; [ii] an inwardly extending crown, having a central opening defining a second cross section, said crown facing said dip tube, with which it limits a transverse communication passage suitable for the passage of liquids from said axial space; [iii] a decompression chamber located immediately downstream of said central opening and defining a first cross section larger than said second cross section; and [iv] at least one transverse mesh, provided with orifices forming the sole passage means, downstream of said decompression chamber.

[0004] A dispensing container provided with a foaming device according to the invention allows the desired amount of foam to be obtained quickly, very cheaply and with a minimal environmental impact by simply squeezing the walls of the flexible material container body. In fact, a dispensing container of this type does not require the use of any special gas, since the gas used in the ambient air. Since the container is not pressurised, the components are very cheap to manufacture. Furthermore, the small number of components required makes the unit even cheaper. The container may be developed as rechargeable, which represents a further saving over the presently known systems and, additionally, both the use of air as propellant gas and the use of rechargeable containers represent a significant reduction of the environmental impact.

[0005] Further advantages and features of the invention will be appreciated from the following description in which there is disclosed a preferred embodiment of the invention without any limiting scope and with reference to the accompanying drawings, in which:

[0006] Figure 1 is an axial sectional view of one embodiment of a dispensing container of the invention, with the stopper member closed.

[0007] Figure 2 is a sectional view similar to the previous Figure, with the stopper member open and arrows showing the gas and liquid flows.

[0008] Figure 3 is a part axial sectional view, on a larger scale, of the neck of the container body and of the foaming device of Figure 2.

[0009] Figure 4 is a part axial sectional view, on a larger scale, of the centre portion of the section of Figure 3.

[0010] Figure 5 is an axial section view of the neck of the container body and of the foaming device, showing the path followed by the foam.

[0011] Figure 6 is a partial axial sectional view of another embodiment of the invention, with a different location of the transverse mesh.

[0012] Figure 7 is a partial axial sectional view of a third embodiment of the invention, with two transverse meshes.

[0013] The dispensing container basically comprises three main members: a container body 1, which is made from flexible material suitable for being deformed by manual squeezing, a stopper member 2 and a foaming device 3 (Figure 1). The container body 1 defines a bottom 4 and a neck 5 forming a mouth.

[0014] The stopper member 2 covers the foaming device 3. In the embodiment described and illustrated, it is suitable for being moved axially between a closed position and an open position (Figures 1 and 2). Nevertheless, the invention also comprises other embodiments of the stopper member, such as a threaded connection, pivoting on a hinge and others.

[0015] The stopper member 2 is provided with an orifice 6 through which the foam exits once formed and which also operates as a valve seat. When the stopper member 2 is in the closed position, the orifice 6 has a stem 7, fixedly attached to the foaming device 3, inserted therethrough, closing the passage between the interior of the foaming device 3 and the outside, whereas when the stopper member 2 is in the open position, the orifice 6 is separated from the stem 7, placing the interior of the foaming device 3 in communication with the outside.

[0016] The foaming device 3 comprises, in turn, a head member 8, a dip tube 9, a dip tube holder 10 and

a transverse mesh 11 (Figures 3 and 4).

[0017] The head member 8 is mounted on the neck 5 and has mounted therein the dip tube holder 10. The dip tube holder 10 is provided with a tubular appendix 12 which penetrates axially in the interior of the neck 5. Within the tubular appendix 12 there is mounted the dip tube 9 in such a way as to leave a hollow axial space 13 between the inner surface of the tubular appendix 12 and the outer surface of the dip tube 9. The dip tube 9 extends, on the opposite side, towards the interior of the container body 1 towards the bottom 2, stopping short thereof. The dip tube 9 is hollow and is suitable to allow fluids to flow therethrough in the axial direction. The end of the dip tube holder 10 opposite to the tubular appendix 12 end consists of a generally cylindrical wall 14, defining a first cross section and a free end surface 15. The interior of the cylindrical wall 14 forms a decompression chamber 16, and is attached to the tubular appendix 12 by means of an inwardly extending crown 17 having a central aperture 18 defining a second cross section substantially smaller than the first cross section of the decompression chamber 16. The crown 17 is provided, on the tubular appendix 12 side, with projections 19 abutting the end of the dip tube 9 which is inserted in the tubular appendix 12 in such a way that there is left a hollow communication passage 20 between the crown 17 and the dip tube 9 which communicates, on one side, with the axial space 13 between the inner surface of the tubular appendix 12 and the outer surface of the dip tube 9 and, on the other side, with the open end of the dip tube 9 and with the central aperture 18 of the crown 17.

[0018] The cylindrical wall 14 is provided, at the end opposite to the crown 17 end, with the transverse mesh 11, which is mounted on the free end surface 15 thereof.

[0019] The dispensing container operates as follows. The dispensing container is placed with the foaming device 3 directed downwardly and must be filled with liquid only up to a certain level 21, such that there is a certain amount of air in the container body 1 and also to prevent the liquid from reaching the dip tube 9. When the flexible side walls of the container body 1 are squeezed, an excess pressure is formed in the interior which causes the air to move axially through the dip tube 9 following the arrows 22 and causes the liquid to move through the axial space 13 as shown by the arrows 23 (Figure 4). The liquid flows through the axial space 13 and hollow communication passage 20 and is introduced into the air flowing through the dip tube 9 inwardly, i.e. in a direction perpendicular to the direction of the air flow, thereby forming a homogenous aerosol type mixture between the liquid and the air. The mixture flow passes through the central aperture 18 of the crown 17 and into the decompression chamber 16. At the end of the decompression chamber 16, the air and liquid mixture flow encounters the mesh 11, which serves to generate the foam which, finally, flows through the terminal end of the stopper member 2, round the stem 7 and out through the orifice 6 (Figure 5).

[0020] The ratio of the second cross section of the central aperture 18 of the crown 17 to the first cross section of the decompression chamber 16 must be such that while the second cross section of the central aperture 18 of the crown 17 has a size such that the air flow speed is caused to be sufficiently high to form an aerosol, the first cross section of the decompression chamber 16 is of such a size as to allow a reduction of the air speed to a speed appropriate for the formation of the foam in the transverse mesh 11.

[0021] . Figure 6 shows another preferred embodiment of the invention, in which a transverse mesh 24 is housed in the decompression chamber 16, being thus lodged between the free end surface 15 of the cylindrical wall 14 and the crown 17. This transverse mesh 24 is mounted on a ring 25, the outside wall of which contacts the inside surface of the cylindrical wall 14.

[0022] Figure 7 shows, finally, a further alternative embodiment of the invention having two transverse meshes 11 and 24, one mounted on a ring 25 and housed in the decompression chamber 16 and the other mounted on the free end surface 15 of the cylindrical wall 14.

Claims

1. A dispensing container provided with a foaming device, comprising: a container body (1) made from flexible material, having a bottom (4) and a neck (5) defining a mouth; a head member (8) fittable to said neck (5); a dip tube (9) extending from said mouth to short of said bottom (4) and allowing fluids to flow therethrough in an axial direction; and a stopper member (2), adapted to occupy alternately a closed position and an open position, characterised in that it comprises a dip tube holder (10) attached to said head member (8) and which is provided with: [i] a tubular appendix (12) penetrating in said neck (5) and in which there is attached said dip tube (9), there being formed between said appendix (12) and said dip tube (9) an axial space (13) suitable for the passage of liquids from said container body (1); [ii] an inwardly extending crown (17) having a central opening (18) defining a second cross section, said crown (17) facing said dip tube (9), with which it limits a transverse communication passage (20) suitable for the passage of liquids from said axial space (13); [iii] a decompression chamber (16) located immediately downstream of said central opening (18) and defining a first cross section larger than said second cross section; and [iv] at least one transverse mesh (11, 24), provided with orifices forming the sole passage means, downstream of said decompression chamber (16).

2. The container of claim 1, characterised in that said decompression chamber (16) is laterally limited by

a generally cylindrical wall (14) having a free end surface (15).

3. The container of claim 1 or 2, characterised in that it comprises a first transverse mesh (11) attached to said free end surface (15), said first mesh (11) being a sole mesh.

4. The container of claim 1 or 2, characterised in that it comprises a second transverse mesh (24) situated between said central aperture (18) of said crown (17) and said free end surface (15) of said cylindrical wall (14), said second mesh (11) being a sole mesh.

5. The container of claim 1 or 2, characterised in that it comprises a first transverse mesh (11) attached to said free end surface (15) and a second transverse mesh (24) situated between said central aperture (18) of said crown (17) and said free end surface (15) of said cylindrical wall (14).

6. The container of claim 4 or 5, characterised in that said second transverse mesh (24) situated between said central aperture (18) of said crown (17) and said free end surface (15) of said cylindrical wall (14) is attached to a ring (25) lodged inside said decompression chamber (16).

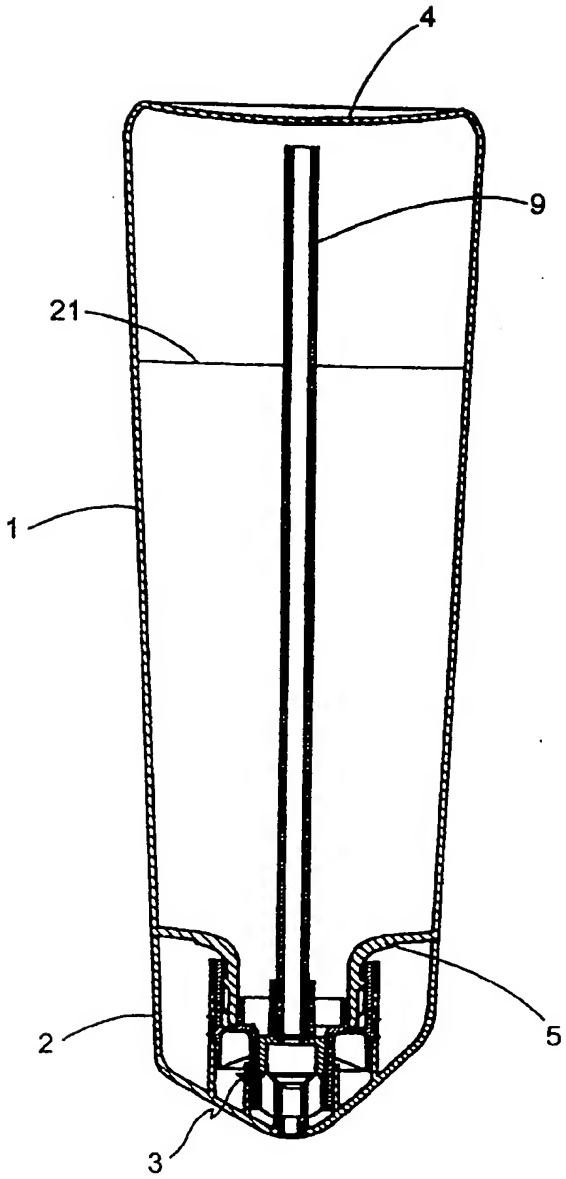

FIG. 1

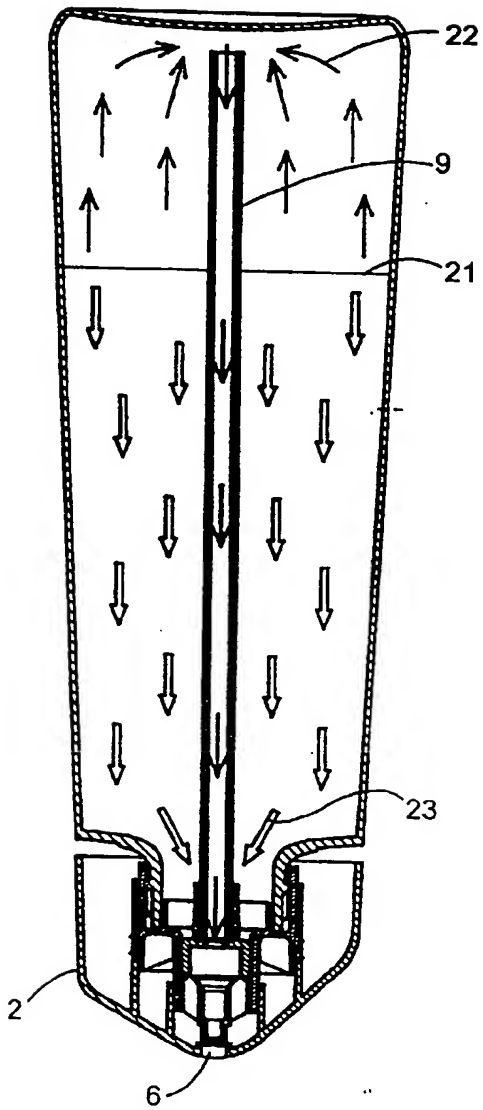

FIG. 2

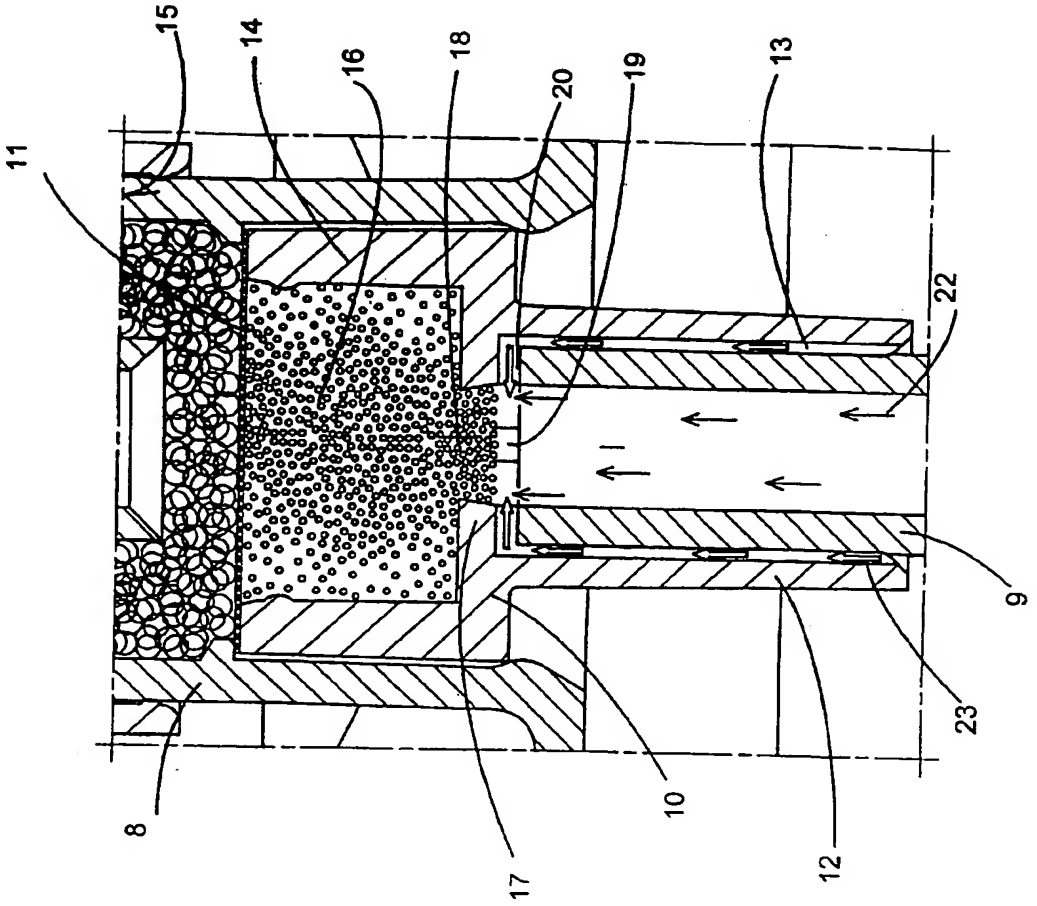

FIG. 4

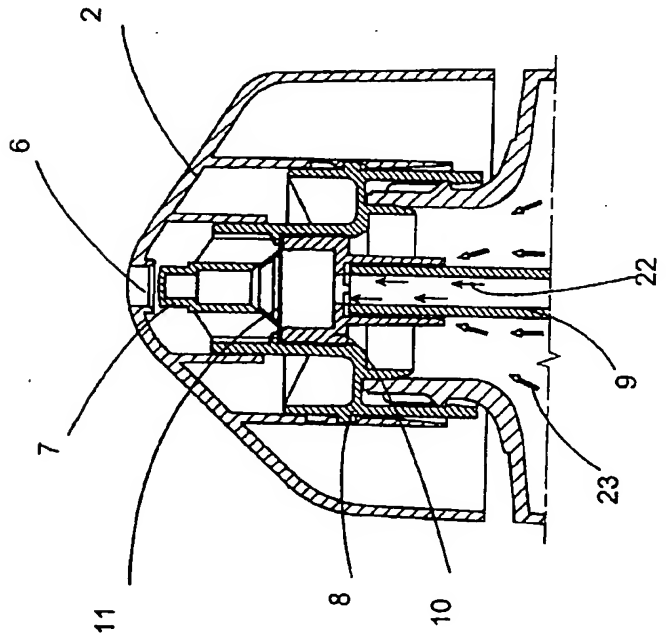

FIG. 3

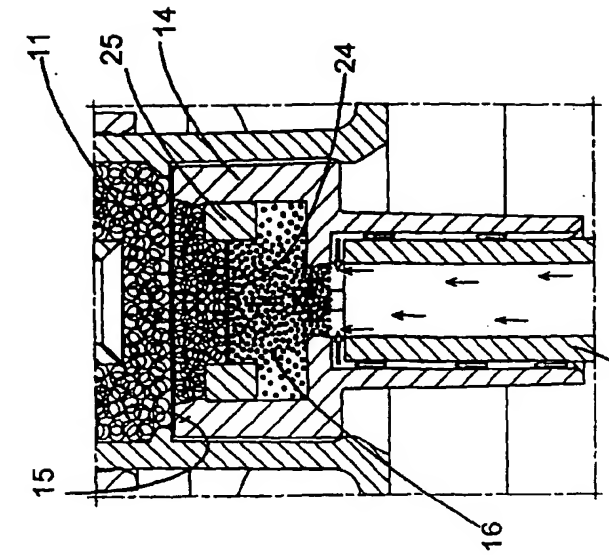

FIG. 7

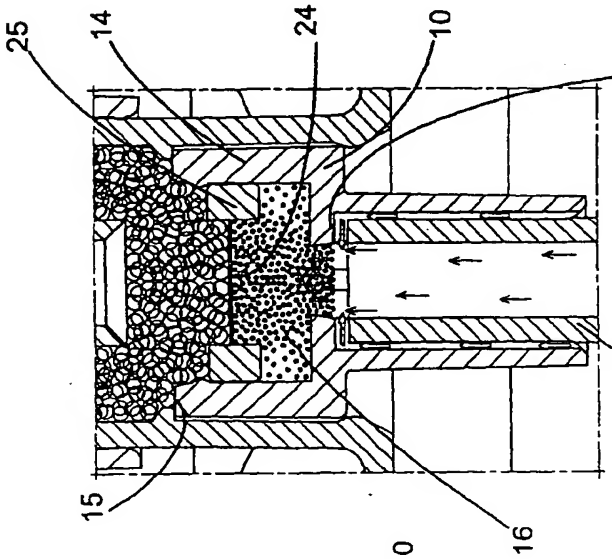

FIG. 6

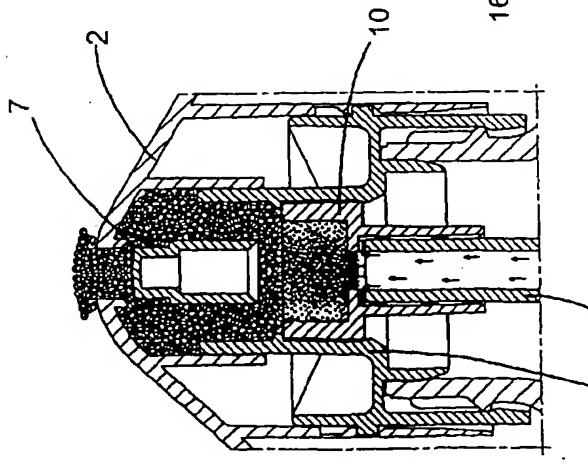

FIG. 5

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EUROPEAN SEARCH REPORT

Application Number
EP 99 50 0042

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X	US 5 048 750 A (TOBLER VIKTOR) 17 September 1991 (1991-09-17) * column 3, line 13 - column 4, line 6; figure 1 *	1-3	B05B11/04 B05B7/00 B65D47/24 B65D1/32
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A	US 4 836 422 A (ROSENBERG WERNER) 6 June 1989 (1989-06-06) * abstract; figures *	1-3	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

B65D
B05B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	7 July 1999	SERRANO GALARRAGA, J

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07-07-1999

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